

Pollutants & Stressors

Impairments IMPACT our waters and our lives



Ecology



Recreation



Health



Economy

Impacts: Ecology, Human Health & Recreation

Bacteria

www.pca.state.mn.us/water/bacteria

Impacts: Ecology & Recreation

Phosphorus

www.pca.state.mn.us/water/phosphorus

Impacts: Ecology & Human Health

Nitrogen

www.pca.state.mn.us/water/nitrogen

Impacts: Ecology & Economy

Chloride (salts)

www.pca.state.mn.us/water/chloride-salts

Impacts: Ecology & Human Health

Mercury

www.pca.state.mn.us/water/mercury

Impacts: Ecology & Economy

Sediment

www.pca.state.mn.us/water/sediment

Bacteria

IMPACTS:

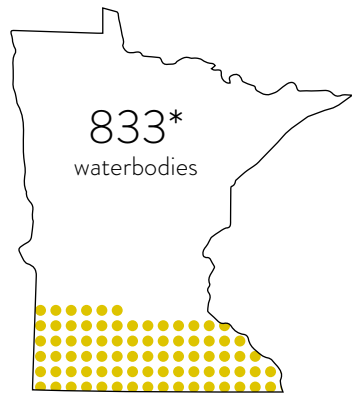
Ecology, Human Health & Recreation



WATER QUALITY STATS

833 water bodies in Minnesota are impaired by *E. coli* & fecal coliform. (MPCA 2020)

Bacteria make up 14% of all water quality impairments in Minnesota.



* 1 dot represents 10 waterbodies

BACTERIA are part of nature. They help dead plants and animals to decompose and are usually safe for people and animals. When we find *E. coli* & fecal coliform in our lakes and streams, however, it is a sign that feces and harmful diseases could be in the water. Common sources of fecal waste include failing septic systems, wastewater treatment plants, and manure from livestock. Urban stormwater also carries feces from dogs, geese and other animals.

Avoid swimming or playing in lakes and streams with bacteria impairments and stay out of the water in ANY lake, river or stream for 2 days after a heavy rain. Young children and the elderly are most at risk of getting sick and can experience diarrhea, nausea, jaundice, headaches, and fatigue.

COMMON SOURCES

Failing
septic
systems



Releases
from
wastewater
treatment
plants



Dog and
goose poop
in urban
areas



Manure
from
livestock



SUMMARY

Finding *E. coli* & fecal coliform in lakes and streams indicates that fecal waste and harmful diseases could be in the water.

Children and adults who swim or play in contaminated water could get sick if they get water in their mouths. Symptoms may include: diarrhea, nausea, jaundice, headaches, and fatigue. Young children and the elderly are most at risk.

WHAT YOU CAN DO

1. **Inspect your septic system** at least once every three years, pump as needed, and replace when needed.
2. **Avoid swimming or playing in lakes and streams with bacteria impairments**, and stay out of the water in any lake, river or stream for 2 days after a heavy rain.
3. **Pick-up and throw dog poop in the trash**, and don't feed ducks or geese.
4. **Work with your soil and water conservation district** to manage manure if you have farm animals.

Phosphorus

IMPACTS:

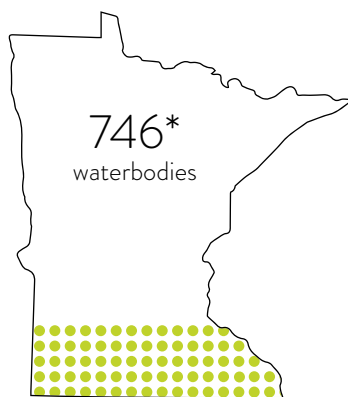
Ecology & Recreation



WATER QUALITY STATS

746 water bodies in Minnesota impaired by nutrients. (MPCA 2020)

Phosphorous makes up 13% of all water quality impairments in Minnesota.



* 1 dot represents 10 waterbodies

PHOSPHORUS is a naturally occurring element found in leaves, grass clippings, soil and other organic matter. In the water, phosphorus feeds aquatic plants and algae. Too much algae makes the water green and smelly, keeps people from enjoying fishing, swimming, and boating. In some cases, algae can even create toxic conditions that are unsafe for children and pets.

Though aquatic plants need *some* phosphorus, stormwater pipes and ditches send much more than is needed into many of our waterways.

COMMON SOURCES

Organic
debris



Dog and
goose poop
in urban
areas



Fertilizers
for
agriculture



Releases
from
wastewater
treatment
plants



Failing
septic
systems



Manure
from
livestock



Sediment
from
erosion



Soil
from
farmland



SUMMARY

Phosphorus is a naturally occurring element that feeds algae. Too much phosphorus can cause algae blooms that make the water green and smelly and can be harmful to people and animals.

WHAT YOU CAN DO

1. **Rake and sweep leaves, grass clippings and debris** off of the pavement and out of the street along your curb line.
2. Follow the law — **use zero-phosphorus fertilizer** on your lawn.
3. Plant a raingarden or convert some lawn to native plants. **Cover bare dirt and repair erosion.**
4. **Inspect your septic system** at least once every three years, pump as needed, and replace when failing.

Nitrogen

IMPACTS:

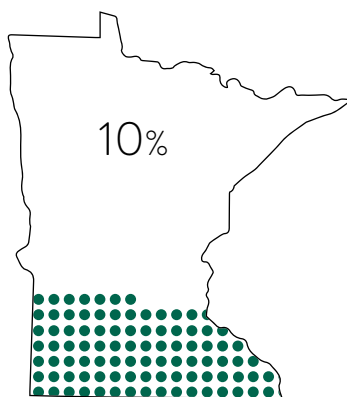
Ecology & Human Health



WATER QUALITY STATS

5 rivers used for municipal drinking water supplies have too high of nitrates. (MPCA 2018)

In 113 townships, **10% or more of private wells** have too high of nitrates. (MDA 2018)



* In 113 townships, more than 10% of wells have too much nitrates

NITROGEN is a naturally occurring element found in soil, as well as manure, human sewage, and fertilizers. Nitrogen in the Mississippi River flows downstream to the Gulf of Mexico, causing a hypoxic “dead zone.” It is harmful to fish and aquatic life in Minnesota lakes and streams, and can also make surface and groundwater unsafe to drink.

Studies show that nitrogen concentrations are increasing in both surface and groundwater in Minnesota. The majority – 72% - of this nitrogen comes from cropland. Smaller amounts come from wastewater treatment plants and septic systems. Urban stormwater is responsible for only 1% of all nitrate in Minnesota waters.

COMMON SOURCES

Failing
septic
systems



Releases
from
wastewater
treatment
plants



Manure
from
livestock



Fertilizers
for
agriculture



SUMMARY

Nitrogen is a naturally occurring element that feeds algae in saltwater systems. Nitrogen in the Mississippi River flows downstream to the Gulf of Mexico and feeds algae, causing a hypoxic “dead zone.” Nitrogen also combines with oxygen to form nitrate, which can make water unsafe to drink. Many communities in southeastern, southwestern and central Minnesota have elevated nitrates in their groundwater.

WHAT YOU CAN DO

1. **Inspect your septic system** at least once every three years, pump as needed, and replace when failing.
2. **Use less nitrogen fertilizer**, especially in areas with sandy soils or karst geology.
3. Support programs that **encourage conservation farming**.
4. Work with your soil and water conservation district to **manage manure if you have farm animals**.

Chloride (salts)

IMPACTS:

Ecology & Economy

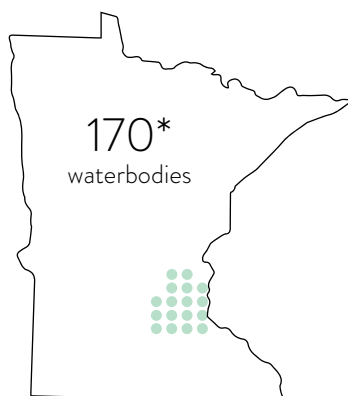


WATER QUALITY STATS

50 lakes and streams in Minnesota are impaired by too much salt.

120 water bodies are threatened by salt.

30% of shallow groundwater wells in the Twin Cities metro area have elevated chlorides.

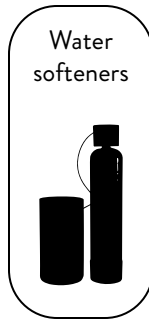
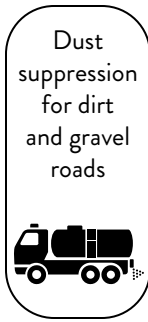
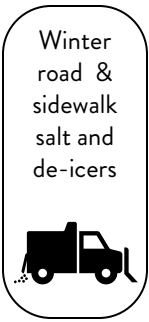


* 1 dot represents 10 waterbodies

SALTS are used to melt snow and ice during the winter, suppress dust on gravel roads, and soften water. But, salt has become a major source of water pollution in Minnesota – especially in the Twin Cities metro area.

Salt kills fish and aquatic life, corrodes roads and bridges, and can even harm wildlife and our pets. We currently have no practical technology to remove salt from surface or groundwater once it is there. It takes only one teaspoon of salt to permanently pollute five gallons of freshwater.

COMMON SOURCES



SUMMARY

Chloride (salt) is a major source of water pollution in Minnesota, especially in urban areas. Salt permanently pollutes surface water and groundwater and harms fish and wildlife.

WHAT YOU CAN DO

1. **Slow down.** Leave early, drive slower, and give plow trucks plenty of space to do their work.
2. **Be patient.** Just because you don't see salt on the road doesn't mean it hasn't been applied. Salt takes time to work.
3. **Shovel first.** Whether you use a shovel, snow blower, snow plow, or ice scraper, get out there as early as you can to shovel your driveway and sidewalk. The more you shovel, the less salt you'll need.
4. **Use salt wisely.** A 12 oz. mug of salt is enough for 10 sidewalk squares or a 20' driveway. Clean up leftover salt and sand to save and reuse. Salt does not melt ice when it is colder than 15° F. Wait until it warms up to avoid wasting money.

Mercury

IMPACTS:

Ecology & Human Health



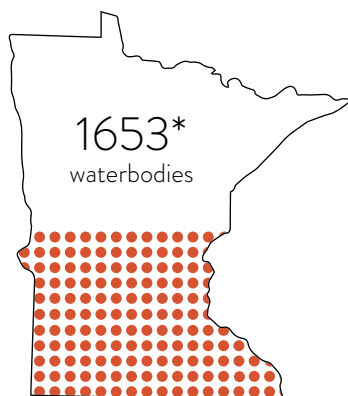
contact:

your city for mercury disposal
information.

WATER QUALITY STATS

1653 lakes and rivers in Minnesota
are impaired by too much mercury.
(2020)

**99% of the mercury in our lakes
and rivers** comes from the
atmosphere.



* 1 dot represents 10 waterbodies

MERCURY is a naturally occurring element that is toxic to humans and animals. It affects human nervous systems, and is particularly harmful to young children and fetuses. Mercury is the most common pollutant in Minnesota's surface water.

Ninety-nine percent of the mercury in our lakes and rivers comes from atmospheric deposition. This happens when mercury is released into the atmosphere during industrial processes. The mercury eventually "falls out" of the air and onto the landscape. When it lands in lakes, the mercury ends up in the water and fish.

There are approximately 1653 water bodies in Minnesota with too much mercury (2020). As a result, the Minnesota Department of Health has issued fish consumption advisories for these lakes and rivers indicating that it may not be safe to eat fish from them more than once a week or once a month.

COMMON SOURCES

Atmospheric deposition from regional, national and global sources:

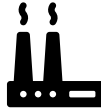
Iron-
mining
and
production
in
Minnesota



Artisanal
and
small-scale
gold mining



Coal-
burning
power
plants



Industrial
processes



Volcanoes



SUMMARY

Mercury is a naturally occurring element that is toxic to humans and animals. Mercury is the leading cause of surface water pollution in Minnesota. Nearly 100% of this mercury comes from atmospheric deposition.

WHAT YOU CAN DO

1. **Reduce electricity consumption.** Shut down your computer and monitor at night, switch to LED light bulbs, unplug idle electronics, and turn off the lights when you leave a room.
2. **Dispose of household hazardous waste properly.** The mercury in thermostats, thermometers, fluorescent lights, gauges, medical and scientific equipment, electrical devices, and household appliances must be removed for reuse or recycling before these products can safely be disposed of or scrapped.

Sediment

IMPACTS:

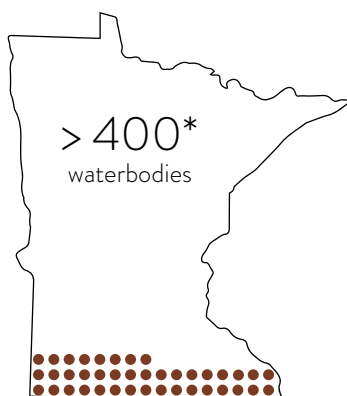
Ecology & Economy



WATER QUALITY STATS

The Minnesota River needs a 90% reduction in sediment loading to meet water quality goals; the **South Metro Mississippi requires a 50% reduction.**

More than 400 water bodies are impaired by turbidity or total suspended solids (caused by sediment).



* 1 dot represents 10 waterbodies

SEDIMENT – soil, dirt, sand, and silt – is a normal part of nature. It becomes a problem for our lakes, rivers and streams when there is too much loose sediment in the water. Sediment can clog the gills of fish and aquatic animals, smother spawning sites, fill-in rivers and streams, and make the water cloudy and unsafe for swimming. In addition, sediment also carries phosphorus with it into our water.

One major source of sediment is erosion along stream and river banks, gullies, ravines, ditches, and river bottoms due to too much flowing water. The erosion is indirectly caused by storm sewer systems, ditches and drain tile, and other alterations that quickly carry rain and melting snow off the land and into our waterways.

Sediment is also washed off of construction sites, farm fields, and patches of bare soil.

COMMON SOURCES



SUMMARY

Sediment – soil, dirt, sand, and silt – washes into lakes, rivers, and streams as a result of erosion. It is a major cause of water pollution in the Minnesota and Mississippi Rivers.

WHAT YOU CAN DO

1. **Cover bare soil** on your property during landscaping and construction projects.
2. **Use erosion control fabric** to protect steep hills and shoreline areas while establishing new vegetation.
3. **Plant trees, shrubs, and deep-rooted native plants** along lakeshores and streambanks to prevent erosion.
4. **Plant a cover crop** after the corn and soybeans are harvested in the fall.